

DRAWING AMENDMENTS

There are no amendments to the drawings.

REMARKS

The following claims were pending in the application: 1 – 19 and 94 - 111

The following claims have been amended: 1-4, 6, 11, 12, 15, 17, 94, 98, 102-105 and 107

The following claims have been cancelled without prejudice: 20 - 93

The following claims have been added: N/A

As a result of the foregoing Amendment, the following claims remain pending in the application: 1 – 19 and 94 – 111.

**The Rejections under 35 U.S.C. § 112**

Claims 1, 3, 4 have been amended to eliminate confusion regarding antecedent basis.

Claim 2 has been amended to state “the visible and infrared ranges”, which is the functional equivalent to the previous phrase “the visible-reflective IR range.”

Claim 6 has been amended to make clear the metes and bounds of the limitation by deleting the phrase “any algorithm selected from the group consisting of.”

Additionally, the algorithm has been amended to make clear the priority of operations. Further, Claim 6 does not recite units, because the values are constants and thus are dimensionless.

Antecedent basis confusion in claim 9 in line 2, claim 10 in line 2, claim 11 in line 2, and claim 12 in line 2 has been eliminated by amending claim 1 to affirmatively provide "method of determining the approximate amount of coliform bacteria in water having an actual amount of coliform therein."

The Examiner has objected to the use of the phrase "correlation value" in claims 9, 10, 11, 12, 101, 102, 103 and 104. The phrase "correlation value" is a term of art that would be known to one skilled in the art. Generally, a correlation value is a number that ranges from -1.0 up through 0 to a maximum value of +1.0. The correlation value indicates how closely the relative positions of two or more variables agree with one another and also indicates the correspondence between two or more variables.

Claim 11 and claim 12 have been amended to state "a method according to claim 6" to eliminate previous antecedent basis confusion.

Claim 15 has been amended to eliminate antecedent basis confusion.

Claim 17 has been amended to make clear the metes and bounds of the limitation and also to eliminate antecedent basis confusion.

Claim 94 has been amended to eliminate antecedent basis confusion.

Claim 98 and claim 101 have been amended to eliminate confusion regarding the priority of operations in the algorithm.

Claim 94 has been amended to eliminate confusion regarding the antecedent basis in claim 101, claim 102, claim 103 and claim 104.

Claim 105 has been amended to provide a site where a measurement takes place and eliminate antecedent basis confusion.

Claim 107 has been amended to eliminate confusion as to the metes and bounds of the limitation.

### **The Rejection under 35 U.S.C. § 101**

The Examiner has rejected claims 1-19 and 94-111 as allegedly directed to non-statutory subject matter. The Examiner has stated:

The claims are drawn to a process of determining an amount of coliform or E.coli bacteria in water from measured reflected-light off water.

Since the claimed invention involves mathematical algorithm, which is a judicial exception, the following analysis of facts of this particular patent application follows the rationale suggested in the "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (OG Notices: 22 November 2005, available from the US PTO website at <http://www.uspto.gov/web/offices/com/sol/og/2005/week47/og200547.htm>)

The Guidelines states:

To satisfy section 101 requirements, the claim must be for a practical application of the § 101 judicial exception, which can be identified in various ways (Guidelines, p. 19):

- The claimed invention "transforms" an article or physical object to a different state or thing.
- The claimed invention otherwise produces a useful, concrete and tangible result.

In the instant claims, there is no physical transformation by the claimed invention because the invention provides obtaining a measurement of reflected light at various wavelength ranges and using an algorithm to determine or relate an approximate concentration of bacteria in the water with an algorithm, thus the Examiner must determine if the instant claims produce a useful, tangible, and concrete final result. Note that at least for one embodiment, "obtaining measurement" can be obtaining measurement data in a computer system.

In determining if the instant claims have a useful, tangible, and concrete final result, the Examiner must determine each standard individually. For a claim to be "useful", the claim must produce a final result that is specific, substantial and credible. For a claim to be "tangible", the claim must set forth a practical application of the invention that produces a real-world final result. For a claim to be "concrete", the process must have a final result that can be substantially repeatable or the process must substantially produce the same result again. Furthermore, the claim must recite a useful, tangible, and concrete final result in the claim itself, and the claim must be limited only to statutory embodiments. Thus if the claim is broader than the statutory embodiments of the claim, the Examiner must reject the claim as non-statutory.

Method claims 1-19 and 94-111 do not produce a tangible final result. A tangible requirement requires that the claim must set forth a practical application of the measured light (data) and the determined approximate amount of bacteria (data), to produce a real-world result. The instant claims are drawn to a method of determining an amount of bacteria. However, the last step of the claims only includes the determining an amount of bacteria, the result of the invention is a set of data, which, in itself, is not tangible. Since the claim itself must include a useful, concrete and tangible final result, the instant claims are non-statutory.

Applicant respectfully submits that the present invention meets the "tangible" standard used to determine whether a practical application exists for a Section 101 judicial exception. In the present invention, the final result of the instant claims is a determination of the approximate amount of coliform in water. Applicant respectfully submits that the determination of the approximate amount of coliform in water is a tangible real-world result obtained from a real-world assay of the amounts of light as claimed.

The Examiner has further stated:

This rejection could be overcome by amendment of the claims to recite that a specific final result of the process is outputted to a user, or by including a result that is a physical transformation. It is noted that claims 13-14, 19, 95 and 108 result in the generation of a report, but it is unclear whether a user would have access to said report or if the report (more data) is stored in a server, database, etc.

Applicant respectfully submits that the Examiner has suggested that the “tangible result” requirement means that a claim must include a physical or visual representation of the “practical application of that judicial exception to produce a real-world result.” However, nowhere in the Manual of Patent Examining Procedure nor in any cases this Applicant could find, is there mention of such a requirement. There is no requirement of a physical or visual embodiment of the result. Applicant respectfully submits that the tangible result requirement is met simply when the process claim sets forth a practical application of a judicial exception that produces a real-world result. The Examiner has apparently collapsed the “tangible” requirement into the physical transformation test, by requiring more than the real-world result that the Applicant respectfully submits is produced by the present invention.

Applicant respectfully submits that the present claims set forth a practical application of a mathematical algorithm from a real-world measurement that produces a real-world result. The determination of the approximation of the presence of bacteria in water has a very valuable real-world result that is apparent in the specification. One such apparent benefit is the ability to determine coliform in bodies of water used for drinking or bathing.

In this same regard, reference to the controlling Federal Circuit precedent is instructive. *State Street Bank* involved a patent directed to a method of determining a profit or loss associated with a hub-and-spoke investment vehicle for the purposes of tax reporting. There was no physical transformation, yet the determination alone was

held clearly to have rendered the claim one to an invention having a tangible beneficial result.

Specifically, the court held “the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces ‘a useful, concrete and tangible result’ – a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities in subsequent trading.” As in *State Street*, the present invention is directed to the transformation of data through mathematical algorithms, resulting in a determination of the amount of coliform in water - a determination that can be relied on by authorities, just as the final share price was relied upon in *State Street*. Applicant respectfully submits that like the hub-and-spoke investment vehicle in *State Street*, the present invention produces a concrete, useful, and tangible result, and therefore is clearly statutory subject matter.

Further, in *State Street*, the court summarized its holding in *Arrhythmia Research Technology Inc. v. Corazonix Corp.*, stating, “we held that the transformation of electrocardiograph signals from a patient’s heartbeat by a machine through a series of mathematical calculations constituted a practical application of an abstract idea (a mathematical algorithm, formula, or calculation), because it corresponded to a useful, concrete or tangible thing – the condition of a patient’s heart.” Applicant respectfully submits that, like the condition of a patient’s heart, the determination of the presence of coliform bacteria in a body of water likewise constitutes a practical application of an

abstract idea, because it is a useful, concrete, and tangible result; and therefore is statutory subject matter.

In addition to *State Street* and *Arrhythmia*, the court in at least one other case determined that a process is statutory if it requires that measurements of physical objects or activities, occurring outside of the computer, be transformed into computer data, and that the computer data itself be transformed. See *In re Gelnovatch*, 595 F.2d 32 (CCPA 1979).

Further, the Federal Circuit has concluded that where the data comprises signals corresponding to or representing physical objects or activities external to the computer system, and where the process causes a physical transformation of those signals, the process is statutory. See *In re Schrader*, 22 F.3d 290 (Fed. Cir. 1994); *In re Abele*, 684 F.2d 902 at 909 (CCPA 1982); *In re Taner*, 681 F.2d 787 (CCPA 1982); *In re Alappat* 33 F. 3d 1526 (Fed. Cir. 1994). Such is the case in the present invention as the data corresponds to or represents physical objects or activities (i.e., the reflection of light with certain wavelength regions from a body of water).

In response to Applicant's previous arguments regarding the "tangible" aspect of the invention, the Examiner has stated:

Applicant's claims as written do not provide a tangible result to a user by a remote means or any other means....None of the claims ensures that a user can have access to the data, i.e., amount of bacteria in the water.

Again, Applicant respectfully submits that Examiner is requiring a physical event to meet the tangible requirement, and no such requirement exists in the MPEP or in existing case law. Because there is no such requirement that a physical event occur, and because the instant claims provide for a determination of the approximation of the



presence of coliform bacteria in water, clearly a real-world result, Applicant respectfully submits that the present invention is directed to statutory subject matter.

With respect to claiming a process consisting solely of mathematical operations, the Manual of Patent Examining Procedure states in Section 2106.01:

In practical terms, claims define nonstatutory processes if they:

- consist solely of mathematical operations without some claimed practical application (i.e., executing a “mathematical algorithm”); or
- simply manipulate abstract ideas, e.g., a bid (*Schrader*, 22 F.3d at 293-94, 30 USPQ2d at 1458-59) or a bubble hierarchy (*Warmerdam*, 33 F.3d at 1360, 31 USPQ2d at 1759), without some claimed practical application.

Here, Applicant respectfully submits, the present invention has an obvious practical application, and thus cannot be said to claim nonstatutory subject matter

### **The Rejection under 35 U.S.C. § 102**

The Examiner has rejected claims 1-5, 94, 96, 97, 105, 109 and 110 as allegedly being anticipated by Turdukulov. The Examiner has stated:

Regarding claims 1, 2, 5, 96, 97 Turdukulov shows measurement of reflected light from water over wavelength ranges of 500-800 nanometers (page 62, Appendix B) and shows organic suspended matter (OSM) concentrations, that includes pathogenic bacteria, such as coliform and E.coli.

Applicant respectfully submits that Turdukulov does not anticipate the present invention, as Turdukulov simply provides for determining the presence of organic suspended matter in water, while the present invention provides for a method to specifically identify the presence of a particular type of bacteria, here,

coliform or E.coli. Therefore, Applicant respectfully submits that Turdukulov does not anticipate claims 1, 2, 5, 96, 97.

Similarly, the Examiner has rejected claim 3, because Turdukulov shows the relationship between total suspended matter and volume of reflectance as a linear relationship. Again, however, Applicant respectfully submits that Turdukulov does not anticipate the present invention, because the present invention provides to the determination of the approximate amount of a particular type of bacteria, rather than the determination of the presence of general "suspended matter," which would include both organic and non-organic matter between which the Turdukulov method does not distinguish.

The Examiner has specifically rejected claims 94, 105, 109 and 110 as allegedly anticipated by Turdukulov. The Examiner has stated: "Turdukulov shows measurement of reflected light from water over wavelength ranges of 500-800 nanometers (page 62, Appendix B) and shows organic suspended matter (OSM) concentrations, that includes pathogenic bacteria, such as coliform bacteria, i.e., E.coli."

Applicant respectfully submits that Turdukulov does not anticipate the present claims, because Turdukulov only provides for the identification of organic suspended matter. That organic suspended matter may or may not include pathogenic bacteria and, again, the Turdukulov method does not distinguish between any type of organic matter, living or dead. The present invention provides for a method to determine the approximate amount of particular bacteria in water. Because Turdukulov only provides for the identification of organic

suspended matter and because there is no direct relationship between that determination and that of coliform bacteria (the former does not necessarily result in a determination of the latter), Applicant respectfully submits that Turdukulov does not anticipate the present invention.

### **The Double Patenting Rejection**

The Examiner has rejected claims 1-19 and 94-111 on alleged nonstatutory obviousness-type double patenting grounds as allegedly being unpatentable over claims 1-17 of U.S. Patent No. 7,132,254. The Examiner has stated: "Although the conflicting claims are not identical, they are not patentably distinct from each other because both inventions detect bacteria from light reflected off the surface of water using LANDSSAT TM band 3, 4, and 5 and encompass some of the same frequency ranges."

The Examiner has further provisionally rejected claims 1-19 and 94-111 on alleged nonstatutory obviousness-type double patenting grounds as allegedly being unpatentable over claims 18-43 of copending Application No. 11/499288.

Applicant respectfully submits that the present invention and the cited inventions, while both methods for detection of matter, detect very different substances. Applicant respectfully submits that the determination of the presence of coliform or E.coli is not an obvious variant of determination of the presence of phycocyanin, and therefore the present invention is not unpatentable on obviousness-type double patenting grounds.

CONCLUSION


In view of the foregoing amendment and accompanying remarks, Applicant respectfully submits that the present application is properly in condition for allowance and may be passed to issuance upon payment of the appropriate fees.

Telephone inquiry to the undersigned in order to clarify or otherwise expedite prosecution of the subject application is respectfully encouraged.

Respectfully submitted,

Date: Feb. 27, 2009

By:

  
\_\_\_\_\_  
Roger A. Gilcrest  
Registration No. 31,954  
Schottenstein, Zox & Dunn Co., L.P.A.  
250 West Street  
Columbus, Ohio 43215  
P: (614) 462-1055  
F: (614) 222-3437  
Email: rgilcrest@szd.com